AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF THE CLAIMS:

Claims 1-10 (Cancelled).

11. (New) A method for determining a velocity model of seismic waves picked up by seismic receivers coupled with an underground formation, in response to the emission of subsoil seismic waves by a seismic source, after reflection by geologic interfaces of the formation, from multi-offset records of the waves, for each seismic event located for the multi-offset records and for each layer delimited by the interfaces comprising:

a) from the prestack seismic records, constructing an iso-offset collection from which kinematic information or travel times associated with the event are extracted;

b) selecting a velocity distribution around a reference velocity in the layer, that is sampled with a predetermined interval;

c) for each velocity sample, applying an inversion technique at a fixed velocity so as to determine, from the travel times extracted from the iso-offset collection, a geometry of the interface for the velocity sample in order to obtain a series of interface/velocity pairs for the event;

d) calculating the kinematic information associated with each obtained

interface/velocity pair, for source-receiver pairs corresponding to multi-offset collections existing in the multi-offset seismic records;

e) for each interface/velocity pair and for each multi-offset collection selected, evaluating coherence between calculated multi-offset travel times and the seismic records, and selecting for each multi-offset collection a travel time curve showing maximum coherence with the seismic records;

f) applying a prestack kinematic inversion method using the multi-offset travel times obtained for all the multi-offset collections selected, in order to determine a geometry and a velocity of the layer being considered; and

g) iterating n times steps a) to f) by considering for each iteration a velocity model obtained during a previous iteration as a reference velocity model to define the reference velocity, and wherein

n is an integer.

12. (New) A method as claimed in claim 11, wherein:

step g) is carried out n times in cases where a velocity range selected is not sufficiently precise at an end of a previous iteration or of steps a) to f).

13. (New) A method as claimed in claim 11, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on offset ranges that are increasingly greater as iterations progress.

14. (New) A method as claimed in claim 12, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on offset ranges that are increasingly greater as iterations progress.

15. (New) A method as claimed in claim 11, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on multi-offset collection grids that are increasingly finer as iterations progress.

16. (New) A method as claimed in claim 12, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on multi-offset collection grids that are increasingly finer as iterations progress.

17. (New) A method as claimed in claim 13, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on multi-offset collection grids that are increasingly finer as iterations progress.

18. (New) A method as claimed in claim 14, wherein:

in cases where the velocity distribution varies laterally and/or in cases where no sufficiently precise a priori knowledge of the velocity distribution in the layer considered is available, step g) is carried out on multi-offset collection grids that are increasingly finer as iterations progress.

19. (New) A method as claimed in claim 11, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, triplication branches in the multi-offset collections are considered independently of one another.

20. (New) A method as claimed in claim 12, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

21. (New) A method as claimed in claim 13, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

22. (New) A method as claimed in claim 14, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

23. (New) A method as claimed in claim 15, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

24. (New) A method as claimed in claim 16, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

25. (New) A method as claimed in claim 17, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

26. (New) A method as claimed in claim 18, wherein:

in step e), in cases where an interface geometry which is sought generates triplications, the triplication branches in the multi-offset collections are considered independently of one another.

27. (New) A method as claimed in claim 19, wherein:

step e) is carried out using ray tracing and inversion tools allowing taking account of multi-valuated arrivals.

28. (New) A method as claimed in claim 11, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

29. (New) A method as claimed in claim 12, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

30. (New) A method as claimed in claim 13, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

31. (New) A method as claimed in claim 15, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

32. (New) A method as claimed in claim 19, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

33. (New) A method as claimed in claim 27, wherein:

a zero-offset or a near-offset iso-offset collection is constructed in step a).

34. (New) A method as claimed in claim 11, wherein:

a fixed-velocity kinematic inversion technique is applied in step c).

35. (New) A method as claimed in claim 11, wherein:

the kinematic information is calculated in step d) by tracing multi-offset rays on an interface of each interface-velocity pair.

36. (New) A method as claimed in claim 11, wherein:

step f) is carried out by applying a prestack kinematic inversion method.

37. (New) A method in accordance with claim 34, wherein:

the fixed-velocity kinematic inversion technique is map migration.

38. (New) A method in accordance with claim 36, wherein:

the prestack kinematic inversion method is prestack travel time tomography.